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मानक

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IS 1885-74 (2012): Electrotechnical Vocabulary, Part 74:
Electrical and magnetic devices [ETD 1: Basic
Electrotechnical Standards]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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IS 1885 (Part 74) : 1993
IEC Pub 50 (151) (1978)

भारतीय मानक

(Reaffirmed 2004)

विद्युत तकनीकी शब्दावली

भाग 74 विद्युतीय और चुम्बकीय युक्तियाँ

Indian Standard

ELECTROTECHNICAL VOCABULARY

PART 74 ELECTRICAL AND MAGNETIC DEVICES

UDC 621.3.042 : 621.318 : 001.4

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

May 1993

Price Group 7

NATIONAL FOREWORD

This Indian Standard (Part 74) which is identical with IEC Pub 50 (151) (1978) 'International electrotechnical vocabulary — Chapter 151 : Electrical and Magnetic devices', issued by the International Electrotechnical Commission (IEC), was adopted by the Bureau of Indian Standards on the recommendation of the Basic Electrotechnical Standards Sectional Committee and approval of the Electrotechnical Division Council.

Only the English text given in the IEC publication has been retained while adopting as Indian Standard, and as such the page numbers given here are not same as in IEC Publication.

Indian Standard
ELECTROTECHNICAL VOCABULARY

PART 74 ELECTRICAL AND MAGNETIC DEVICES

SECTION 151-01 — GENERAL

151-01-01

electrical device

An assembly of components utilizing electromagnetic energy to perform a required function.

Note. — A device may be considered as a component of a larger assembly.

151-01-02

conductor

A component intended to carry electric conduction current.

151-01-03

terminal (as a component)

A component provided for the connection of a device to external conductors.

151-01-04

electrode

A conducting part intended as a conducting interface with a medium of different conductivity.

Note. — Between two electrodes of a device, there is normally a potential difference and there may be a current.

151-01-05

anode (of a device)

An electrode through which current normally enters the medium of different conductivity.

151-01-06

cathode (of a device)

An electrode through which current normally leaves the medium of different conductivity.

151-01-07

earth

ground (except UK)

The conducting mass of the Earth, whose electric potential at any point is conventionally taken as zero.

151-01-08

earth (ing-conductor)

A conductor of low impedance connected to Earth.

151-01-09

chassis; frame

A conductive body whose potential is taken as reference.

151-01-10

insulator

A component designed to support and insulate a conductive body.

151-01-11

(insulating) bushing

An insulator used to form a passage for a conductor through a non-insulating partition.

151-01-12

capacitor bushing

condenser bushing (deprecated)

A bushing in which a desired voltage grading is obtained by an arrangement of capacitors.

151-01-13

screen

shield (USA) (deprecated in UK in this sense)

A device used to reduce the penetration of a field into an assigned region.

151-01-14

electric screen

A screen of conductive material intended to reduce the penetration of an electric field into an assigned region.

151-01-15

magnetic screen

A screen of ferromagnetic material intended to reduce the penetration of a magnetic field into an assigned region.

151-01-16

electromagnetic screen

A screen of conductive material intended to reduce the penetration of a varying electromagnetic field into an assigned region.

151-01-17

grading screen

A component of conductive material intended to provide voltage grading.

151-01-18

shield

A mechanical barrier or enclosure provided for protection.

151-01-19

busbar

A low-impedance conductor to which several electric circuits can be separately connected.

151-01-20

turn

A conductor or a group of conductors formed into a loop.

151-01-21

coil

A set of series-connected turns, usually coaxial.

151-01-22

solenoid

A cylindrical coil, whose length is usually much greater than its transverse dimensions.

151-01-23

winding

An assembly of turns or coils having a defined function in an electrical device.

151-01-24

bifilar winding

A winding consisting of two contiguous insulated conductors.

Note. — If the two conductors are connected to carry the same current in opposite directions, the inductance of such a winding is generally negligible.

151-01-25

(magnetic) core

The magnetic part of a device around which windings are generally placed.

151-01-26

laminated core

A core composed of sheets of ferromagnetic material insulated from one another for the purpose of reducing eddy currents.

151-01-27

wound core

A laminated core made of a continuous strip or strips wound spirally layer upon layer.

Note. — This term is also used to designate a core provided with a winding.

151-01-28

yoke (of a transformer, electromagnet, relay or other device)

A fixed ferromagnetic part, usually not surrounded by a winding, whose principal purpose is to complete the main magnetic circuit.

151-01-29

air gap (of a magnetic circuit)

A short gap in the magnetic material part of the magnetic circuit.

151-01-30

resistor

A device used because of its resistance.

151-01-31

varistor

A resistor having a very large variation of resistance with applied voltage.

151-01-32

thermistor

A resistor having a very large and non-linear variation of resistance with temperature.

151-01-33

inductor

A device used because of its inductance.

151-01-34

smoothing inductor

choke (deprecated)

An inductor designed and used to reduce the alternating component of a pulsating current.

151-01-35

capacitor

A device used because of its capacitance.

151-01-36

blocking capacitor

A capacitor mainly used to prevent the flow of the direct component of a pulsating current.

151-01-37

magnet

A device intended to have an external magnetic field.

151-01-38

permanent magnet

A magnet which requires no current to maintain its field.

151-01-39

electromagnet

A magnet which requires current to maintain its field.

151-01-40

poles of a magnet

The parts of a magnet from which the useful external magnetic flux enters or leaves the magnet.

151-01-41

keeper

A high-permeance piece of magnetic material placed across the poles of a permanent magnet to protect it from unintentional demagnetization or to reduce its external field.

151-01-42

(electrical) relay

A device designed to produce sudden predetermined changes in one or more electrical output circuits, after the appearance of certain conditions in the electrical input circuits controlling the device.

151-01-43

(electric) shunt

A conducting device connected in parallel with part of a current carrying electric circuit to divert current from that part.

151-01-44

magnetic shunt

A device of magnetic material which is placed in parallel with part of a magnetic circuit to divert flux from that part.

151-01-45

on-off switch

A device for closing or opening one or more electric circuits.

151-01-46

change-over switch; selector switch

A device for changing the connections of one or more electric circuits.

151-01-47

reversing switch

A device for changing the direction of a current in part of an electric circuit.

151-01-48

spark-gap

A device with two or more electrodes designed for sparkover to occur under specified conditions.

151-01-49

electric energy transducer

A device for converting or transferring energy, in which at least one of the forms of energy is electrical.

151-01-50

electric signal transducer

A device for converting or transferring signals and in which at least one of the forms of signals is electrical.

151-01-51

electric machine

An electric energy transducer that converts electric energy into mechanical energy or vice versa.

151-01-52

(electric) generator

An electric machine that converts mechanical energy into electric energy.

151-01-53

(electric) motor

An electric machine that converts electric energy into mechanical energy.

151-01-54

transformer

A static electric energy transducer that transfers electric energy without change of frequency.

151-01-55

frequency convertor

frequency changer (USA)

An electric energy transducer that transfers electric energy with change of frequency.

151-01-56

phase convertor

An electric energy transducer that transfers electric energy with change of number of phases.

151-01-57

rectifier

An electric energy transducer that converts alternating current to unidirectional current.

151-01-58

inverter

An electric energy transducer that converts unidirectional current to alternating current.

151-01-59

phase shifter

An electric transducer that introduces a phase change between input and output.

151-01-60

(electric) sensor

An electric signal transducer that converts a signal of any kind into an electric signal.

151-01-61

(electric) actuator

An electric transducer that converts an electric signal into a signal of any kind, such as mechanical displacement.

151-01-62

amplifier

A device used to increase the value of a quantity by means of energy drawn from an external source.

151-01-63

oscillator

A device producing alternating current whose frequency is determined by the characteristics of the device.

151-01-64

[151-01-65]

pass [stop]-band

A frequency band throughout which the attenuation is

less [greater] than a specified value.

151-01-66

cut-off frequency

A frequency of a pass-band or stop-band at which the attenuation reaches a specified value.

151-01-67

low-pass filter

A filter having a single pass-band extending from zero frequency up to the cut-off frequency.

151-01-68

high-pass filter

A filter having a single pass-band extending from the cut-off frequency upwards.

151-01-69

band-pass filter

A filter having a single pass-band, neither of the cut-off frequencies being zero or infinite.

151-01-70

band-stop filter

A filter having a single stop-band, neither of the cut-off frequencies being zero or infinite.

151-01-71

electronic tube

A device in which conduction takes place by electrons or ions between electrodes through a vacuum or gaseous medium within a gas-tight envelope.

151-01-72

vacuum tube

An electronic tube evacuated to such a degree that its electrical characteristics are essentially unaffected by the ionization of any residual vapour or gas.

151-01-73

gas-filled tube

An electronic tube in which the electrical characteristics are substantially established by the ionization of deliberately-introduced vapour or gas.

151-01-74

semiconductor device

A device whose essential characteristics are due to the flow of charge carriers within a semiconductor material.

151-01-75

photoelectric device

A device whose essential characteristics are due to the

emission of electrons caused by the absorption of photons.

151-01-76

delay line

An electric device specifically designed to introduce a desired delay in the transmission of a signal.

151-01-77

matching transformer

A transformer designed for insertion between two circuits having different impedances to optimize the power of the signal transferred.

SECTION 151-02 — CONNECTIONS OF ELECTRIC CIRCUITS

151-02-01

closed circuit

A circuit with a continuous path for current.

151-02-02

open circuit

A circuit in which the continuity of the path for current has been broken.

151-02-03

to connect

To join conductors so that they are in electrical contact with one another.

151-02-04

connection

1. A junction between conductors.
2. A conductor or circuit for joining terminals or other conductors.

151-02-05

connection

A mode of connecting conductors or devices.

Examples: series, parallel, delta, star connection.

151-02-06

interconnection

The connection of distinct networks to each other.

151-02-07

series connection

The connection of devices so that the same current passes through all of them.

151-02-08

parallel connection

The connection of devices so that the same voltage is

applied to all of them.

151-02-09

resonant circuit

An electric circuit operating near resonance.

151-02-10

series-resonant circuit

A resonant circuit with a single path containing capacitance and inductance in series.

151-02-11

parallel-resonant circuit

A resonant circuit with two paths in parallel, one containing capacitance and the other inductance.

151-02-12

bank of

. - bank

A number of devices of the same kind so connected as to act together.

151-02-13

single-phase (voltage)* source

1. A source supplying a single alternating voltage.
2. By extension, a set of alternating voltages having constant ratios of their instantaneous values.

151-02-14

polyphase (voltage) source

A source supplying a set of two or more interrelated alternating voltages that have a common frequency but normally differ by a constant time-lag; they generally have similar amplitudes and waveforms.

* All definitions applying to voltage sources can by extension be applied to current sources.

151-02-15

symmetrical polyphase (voltage) source

A polyphase source whose m alternating voltages have the same waveform and the same amplitude and whose successive time-lags are equal to the same whole multiple of the fraction $1/m$ of the period.

Note. — The set of m voltages of a symmetrical polyphase source can be represented by:

$$u_i(t) = u \left[t + (i - 1) \frac{kT}{m} \right]$$

$$i = 1, 2, \dots, m$$

where T is the period and k is an integer, usually 1.

151-02-16 [17] [18] [19]

2-phase [3-phase] [4-phase]

[m - phase] (voltage) source

A polyphase source supplying two, [three] [four] ... [m] alternating voltages.

151-02-20

quarter-phase (voltage) source

A polyphase source supplying two alternating voltages of the same amplitude, with a time-lag equal to

one-quarter of a period.

151-02-21 [22]

single-phase [polyphase] device

A single-phase [polyphase] source, or a device intended to be energized by such a source.

151-02-23

star-connected device

An m -phase device whose m branches have a common node.

151-02-24

mesh-connected device

An m -phase device whose m branches form a single loop.

151-02-25

delta-connected device

A three-phase mesh-connected device.

151-02-26 [27]

single phase [polyphase] circuit

A set of interconnected single-phase [polyphase] devices.

SECTION 151 - 03 — BEHAVIOUR AND USE OF ELECTRICAL DEVICES

151-03-01

change-over switching

The transfer of connections from one set of conductors to another.

151-03-02

commutation

Change-over switching in a periodic and automatic manner.

151-03-03

cycle of operation

A series of operations that may be repeated at will or automatically.

151-03-04

input power

The total power supplied to a device or assembly of devices.

151-03-05

output power

The power delivered by a device in a specific form and for a specific purpose.

151-03-06 [07]

input [output]

A qualifying term applied to quantities : (voltage, current, impedance, ...) or to components (terminals, leads, ...) which are associated with the reception [delivery] of power or signals.

151-03-08

load

1. A device that absorbs power.
2. The power delivered by a device.

151-03-09

to load

To cause a device or circuit to deliver power.

151-03-10

to charge

To store energy in a device.

151-03-11

to discharge

To extract all or part of the energy stored in a device.

151-03-12

on load

on-load operation

The operation in which a device or circuit supplies output power.

151-03-13

no-load operation

The operation of a device or a circuit from which there is no output power (but under otherwise normal operating conditions).

151-03-14

open-circuit operation (of a circuit or a generator)

No-load operation with zero output current.

151-03-15

short-circuit operation (of a circuit or a generator)

No-load operation with zero output voltage, the output terminals being short-circuited.

151-03-16

full load

The highest value of a load specified for rated conditions of operation.

151-03-17

efficiency

The ratio of the output power to the input power.

151-03-18

loss; losses

The difference between the input power and the output power of a device.

151-03-19 [20]

over-voltage [over-current]

A voltage [current] of a value exceeding the highest rated value.

151-03-21

under-voltage

A voltage of a value falling below the lowest rated value.

151-03-22

overload (as a noun)

The excess of actual load over full load.

Note. — The term 'overload' should not be used as a synonym for overcurrent.

151-03-23

synchronism (of periodic quantities)

The condition where two or more periodic quantities of one or more devices have the same frequency.

151-03-24

to synchronize

To bring two or more devices or circuits into synchronism.

151-03-25

tuning (of a device)

The process of adjusting one of the resonance frequencies of a device by varying the value of one or more of its parameters.

151-03-26

characteristic

A relationship between two or more variable quantities which describes the performance of a device under given conditions.

151-03-27

insulant

A material, generally a dielectric, used to prevent conduction current.

151-03-28

to insulate

To prevent conduction between separate conductive bodies.

151-03-29

to isolate

1. To disconnect completely a device or circuit from other devices or circuits.

2. To provide (by separation) a specified degree of protection from any live circuit.

151-03-30

insulation (material)

All the material used to insulate a device.

151-03-31

insulation (property)

All properties acquired by a conductor by virtue of its being insulated.

151-03-32

insulation resistance

The resistance under specified conditions between two conductive bodies separated by insulating material.

151-03-33

loss angle (under sinusoidal conditions)

The angle whose tangent is the ratio of the active power to the absolute value of the reactive power.

151-03-34

quality factor

Q factor

The ratio of the absolute value of the reactive power to the active power.

151-03-35

leakage current

earth current (deprecated in this sense)

The current in a path other than that desired, due to imperfect insulation.

151-03-36

earth current

All the leakage currents and capacitive currents between a conductor and the earth.

151-03-37

creepage distance

The shortest distance along the surface of the insulating material between two conductive parts.

151-03-38

voltage grading

The reduction of marked inequalities of potential gradient in or along an insulator or insulation.

151-03-39

fault

Any undesired change that impairs normal operation.

151-03-40

earth fault

A fault caused by a conductor being connected to earth or by the insulation resistance to earth becoming less than a specified value.

151-03-41

short circuit

The accidental or intentional connection, by a relatively low resistance or impedance of two or more points in a circuit which are normally at different voltages.

151-03-42 [43] [44]

resistive [inductive] [capacitive]

Applies to a device or circuit in which, under given conditions, the predominant quantity is resistance [inductance] [capacitance].

151-03-45

reactive

Applies to an inductive or capacitive device or circuit.

151-03-46

conductive

Applies to a medium to indicate that it can conduct current.

151-03-47

conducting

Applies to a device or a circuit to indicate that it is carrying a current.

151-03-48 [49]

live [dead]

Applies to a device or a circuit to indicate that a voltage is [is not] applied.

151-03-50

electricity

1. The manifestation of a form of energy associated with static or dynamic electric charges.
2. The special field of science and technology dealing with electric phenomena.

151-03-51

electric (adjective)

Containing, producing, arising from, or actuated by electricity, such as electric energy, electric lamp, electric motor.

151-03-52

electrical

Related to or associated with electricity, but not having its properties or characteristics, such as electrical engineer, electrical handbook.

SECTION 151-04 — PERFORMANCE AND TESTING

151-04-01

nominal value

A suitable approximate quantity value used to designate or identify a component, device or equipment.

151-04-02

limiting value

In a specification, the greatest or smallest admissible value of one of the quantities.

151-04-03

rated value

A quantity value assigned, generally by a manufacturer, for a specified operating condition of a component, device or equipment.

151-04-04

rating

The set of rated values and operating conditions.

151-04-05

environmental conditions

Those characteristics of the environment (altitude, temperature, humidity, ...) which may affect performance.

Notes.

1.— These may include, for example, pressure, temperature, radiations, vibrations.

2.— *Site conditions* are the range of environmental conditions for a given site.

151-04-06

duty

duty cycle

load cycle (deprecated)

A sequence of operating conditions to which a component, device or equipment is subjected.

151-04-07

uninterrupted duty

A duty without any off-load period.

151-04-08

continuous duty

A duty at a substantially constant load for an indefinitely long time.

151-04-09

intermittent duty

A duty with on-load intervals alternating with off-load intervals.

151-04-10

short-time duty

An intermittent duty with on-load intervals short in comparison with off-load.

151-04-11

periodic duty

A type of duty in which operation whether at constant or variable load is regularly repeated.

151-04-12

varying duty

Operation at loads and for intervals of time both of which are subject to wide variations.

151-04-13

duty ratio

The ratio for a given time interval of the on-load duration to the total time.

151-04-14

insulation level

The test voltage under specified conditions, that the insulation of a device is designed to withstand.

151-04-15

type test

A test of one or more devices made to a certain design to show that the design meets certain specifications.

151-04-16

routine test

A test to which each individual device is subjected during or after manufacture to ascertain whether it complies with certain criteria.

151-04-17

sampling test

A test on a number of devices taken at random from a batch.

151-04-18

life test

A test to ascertain the probable life under specified conditions, of a component or device.

151-04-19

endurance test

A test on a device under specified conditions involving particular operations for a certain time and purpose.

Note.— These operations may involve repetitions, special severe conditions such as short circuits, over-voltages, vibrations, shocks.

151-04-20

acceptance test

A contractual test to prove to the customer that the device meets certain conditions of its specification.

151-04-21

commissioning test

A test on a device or equipment carried out on site, to prove the correctness of installation and operation.

151-04-22

maintenance test

A test carried out periodically on a device or equipment to ascertain and, if necessary, make certain adjustments to ensure that its performance remains within specified limits.

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amplifier
anode (of a device)

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band-stop filter
bank of....
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bifilar winding
blocking capacitor
busbar
bushing (insulating)

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